EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S5	0	S4 and ((improper or incorrect or unintentional or unintended or mistake) with orbit)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/11/22 16:38
S4	150	insurance with (satellite or spacecraft or spaceship or rocket or (space with craft))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/11/22 16:38
S3	1	S1 and (rescue with mission)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/12/15 12:31
S6	14	bleck$.xa.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/12/15 12:37
S7	5	705/4.ccls. and provost$.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/12/15 12:55
S8	2	("6208973").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/12/15 13:30
S9	2	("7072842").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/12/15 15:48
S10	2	("6466914").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/12/15 16:35

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Time of Request: Wednesday, November 08, 2006 17:30:27 EST
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Research Information

Service: Terms and Connectors Search
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October 1, 1999

SECTION: No. 635, Vol. 54; Pg. 14

IAC-ACC-NO: 57386992

LENGTH: 2220 words

HEADLINE: Faster, cheaper ... but not so good?

BYLINE: BULLOCH, CHRIS

BODY:

Satellite operators are becoming increasingly indifferent to losses or delays -- if all goes well, the customer pays; if not, the insurer pays. Testing and redundancy levels are suffering as a result

The spirit of Matra Marconi's troublesome solar arrays tended to hover over Euroconsult's recent Paris conference on "Financing for Satellite Communications and Broadcasting". It was not the only Bad Fairy present: the insolvencies of Iridium and Ice were discussed more frequently, but in the absence of anyone from either company, there was little information, factual or otherwise, on how restructuring was proceeding.

The consensus opinion was that ICe's problems were relatively manageable, and that its debt load was by no means excessive. The failure of existing investors to subscribe to this summer's twice-extended discounted rights issue in sufficient quantity was ascribed by some to an excessive number of investors, each with insufficient financial commitment to the project. Though most of them are established telcos and a number are routinely risking amounts that make ICe's needs look like pocket change, the slightest whiff of trouble (the Iridium effect) makes them lose interest.

One interesting concept which emerged in a presentation by Stanislas Chapron, from the Executive Committee of insurers Cecar & Jutheau (members of the Marsh Group), concerned the availability of cover for "failure of an expected market to emerge". Despite the often-quoted remark to the effect that "one can insure against anything, for a price", there was no real consensus on this. It was commented that the question could have been rephrased: "Can you insure against listening to consultants", most of whom had predicted booming markets for the Global Mobiles.

While Iridium and Ice (not to mention Globalstar) were absent from the conference, Armand Carlier, CEO of MMS, was there and on the platform. But he made no reference whatsoever to the current solar array problem, unless his remark that a "significant decline in profits from satellite manufacturing was to be anticipated" had some relevance here. He concentrated more on the question of going into operations to compete with existing customers, something which the past MMS (soon to be Astrium?) has not sought to do. Following the meeting, Carlier did give an interview to another paper, in which he acknowledged that the company still had not succeeded in explaining satisfactorily the power-loss problem, and that no other statement would be forthcoming.

Underwriter's cautious view

After the Euroconsult meeting, Interavia sought out one of Europe's best-known space underwriters -- who preferred to remain anonymous -- and tried in tactful terms to discover their views on MMS-type situations. This would involve a long chain of interlocking suppliers, a large number of customers all apparently suffering from the same problem, and no apparent solution. It was agreed that no names would be named.

As recently as 1995, two-thirds of satellite "accidents" could be attributed to the launch vehicle. By last year, almost the same proportion (64.82%) were satellite-related. Excluding apogee motor failures and deployment problems

(the commonest causes of post-launch failures), a residual 10% of troubles occurred after the spacecraft was fully functioning.

There are plenty of things that can go wrong with a satellite. The discussion was triggered by the present array problems; but last year it was Hughes' onboard processors that were attracting unwelcome limelight. This was a problem more sudden and serious than a slow power degradation.

But regarding arrays, the underwriter said that satellites used to be produced with plenty of built-in power margins; 3dB -- equivalent to 50% -- was common. This gave manufacturers a 15% margin before any question of loss claims could arise. Now, there is effectively NO margin. Any parameter which does not "meet specs" almost automatically generates a claim, which all too often has been met by insurers anxious to retain business. "We would have paid out vast amounts if this policy had been operating five years ago," said the underwriter.

In theory, of course, the MMS array problem does not involve space insurance at all. Most of the satellites have not left the factory, let alone the launchpad, and so are covered by whatever arrangements have been put contractually in place between all members of the supply chain. The same would apply to any manufactured goods. It is to be hoped that these are adequate, and proper safeguards are in place.

Distinctions are often made between "off-the-shelf" components and those specially tailored to meet a customer's requirements. Here the responsibility of the customer becomes involved. In the past, virtually nothing in the satellite business was off the shelf. But this is changing. Satellites are becoming a commodity; but even with commodities, certain "fitness for use" principles apply. The trouble with satellite arrays is that power is generally specified as "End Of Life" power, which nowadays may mean in 15 years' time. It is very difficult to demonstrate this.

As the satellite business is being driven far more by competition, operator CEOs are tending to become more indifferent to losses or delays. If all goes well, the customer pays. If not, the insurer pays. Consequently, testing and redundancy levels both suffer, with the apparent acquiescence of certain insurers. The underwriter submitting to this interrogation pointed out that with military satellites, it is common for these to cost five times more than a near-equivalent commercial craft. Most of the difference lies in redundancy and testing. (How will this affect PPP projects such as Skynet 5?)

But even as satellites get bigger and more complicated, it is too often these more intangible items' which get discarded first, in an effort to drive costs down. There are now signs that insurers are waking up to this situation, and increasing rates, from typically 10% or even less (including launch), to 15%. Maybe brokers will demand longer in-orbit coverage periods in return. But it is certain that until quite recently, some underwriters have been thinking of getting out of the space insurance business altogether.

Regional GEO-mobiles on the way While the LEO/MEO mobile systems are perhaps temporarily under a cloud, the rival geostationary regional systems have at least the advantage of not yet having come to market. Of those to have emerged so far, only Satphone has failed to raise even sufficient money to start construction. AMPS of course had its construction interrupted by the US government, costing Hughes nearly $ 100 million. ACeS and Thuraya seem well on the way to launch; with the first Indonesian ACeS Garuda satellite set for launch this October. However, Aces operator Pasific Satelit Nusantara has reported a $ 30.4 million net loss in the first half of this year, compared with $ 11.3 million net income in the January-June period of 1998. This, coupled with the continuing disturbed situation in Indonesia, must give some cause for concern.

Other regional GEO-mobiles are the former EAST, originated by Matra Marconi Space but now relegated to a "deep freeze" status by the manufacturer. It is being continued by the Cyprus Development Bank under the name "Cyprus GEM". The banks Project Financing Division head, Savakkis C. Savvides, left it unclear who had dumped whom. He now lists Alenia Aerospazio (and Hughes S&CI) as "teaming participants", which does not necessarily mean investors. Alenia is of course set to join MMS and Dasa in Astrium; how much freedom to pursue ventures dropped by other group members will be allowed within Astrium is as uncertain as the date of its formal inauguration. Hughes has a policy of "in principle" not buying satellite contacts by investing in its customers; it may be now regretting departing from this principle in the case of ICO. The born-again Agrani GEO-mobile (Afro-Asian Satellite) is now headed by Jai P. Singh, previously with ICO but who "got out in time". It is still an Essel company (packaging and amusement parks). Agrani is initially heading for Indian coverage only, and will not carry (or at least not encourage) international traffic. "In principle" $ 230 million investment participation has been confirmed, chiefly from Indian telco VSNL and Lockheed Martin Global Telecommunications; the latter does not seem shy of rushing in where Hughes fears to tread. The company is planning to keep user costs low (9 US cents/minute), and looks to maintain a debt/equity ratio of 1:1.

Thuraya, too, believes equity commitments are vital before starting-up. There seem to be signs that the GEO multimedia satellite manufacturers are finally cutting metal: at least Hughes Spaceway is, now backed by massive investments from General Motors and AoL. Michael J. Houterman, president of Hughes Space & Communications International, claimed that high-speed internet traffic -- in large measure broadcast to multiple sites -- would be the main focus of satellite industry growth, which would expand from its present level of $ 70 million to around $ 30 BILLION/year within a relatively short time.

Houterman acknowledged complaints that 1998 had been a very bad year for insurance claims especially for in-orbit failures -- and that satellite manufacturers had to take "steps to mitigate risk." These would include multiplying the number of test facilities (four satellite-sized thermal vacuum test chambers, for example, or five near-field antenna test ranges). But Houterman still spoke of turning round new satellites within a year, something recently applauded but now giving pause for second thoughts. Finally, just to make the point largely ignored in the conference itself, "affiliated but separate" brokers/dealers Salomon Smith Barney -- who did give a presentation -- also had on their stand a brochure issued in August 1998 which stated its belief that "there is a market willing and able to pay a premium for global mobility." It forecast at that time that "wireless satellite" subscribers would total 1 million by the end of this year, reaching 6 million by 2001 and 18 million by end-2004. It was forecasts like these which drove up the Big LEOs/MEOs share prices and allowed their debts to mount; it remains to be seen whether the forecasters will be proved right in the long run.

But in his presentation, John F. Otto of SSB acknowledged that "Wall Street can understand cable", and emphasized that companies like PanAmSat (now 81% owned by Hughes) is effectively "a cable network in the sky". It has multicasting advantages which far outweigh those of mobile telephony -- which are preeminently point-to-point systems.

RELATED ARTICLE: RENT A SPARE SATELLITE WITH ASSURESAT

Jerald Farrell, retired as president of Hughes Communications Services and responsible for its Galaxy operation, now merged into PanAmSat, came to Euroconsult's Paris conference to deliver an unwelcome message. "Satellites like the Hughes HS 376 used to be ultra-reliable; large, complex newer craft" the must have meant the HS 601; the 702 has no track record so far) "are failing at a much higher rate," largely because they carry 3-5 times more hardware. The total loss figure including loss of business -- for a total failure was escalating horrendously. The Telstar 401 loss a few years back cost its then owner AT&T $ 750 million in all, including a substantial sum docked from the price Loral was prepared to pay for the Telstar business it was in the course of acquiring. Galaxy 10 -- lost on the brief maiden flight of the Delta III last summer -- notched up a business loss to would-be operator PAS totalling $ 1.06 billion.

Farrell is to spend his retirement running AssureSat, in partnership with Mark Fowler (a former FCC chairman) and Securitas, the Swiss reinsurance company and securityguard service.

AssureSat will buy and fly spare satellites; the first two have already been ordered from Space Systems/Loral. Designed for maximum versatility, the FS-1300s will carry 36 all-active transponders (800MHz) in two C bands and 72 transponders (36 active) in four Ku bands (1500MHz), but they will not carry a 17GHz DBS uplink receiver. Variable switched polarization will be available. Antenna coverage from steerable dishes will be designed to reach all key markets. The satellites will each offer 10kW DC power. Sufficient fuel will be carried to ensure four extra years of active life; of course precise station-keeping will not be needed when no-one is using a satellite, but Farrell hopes this will not be often.

No new orbital slot allocations will be needed; when not required, the silent AssureSat will be quietly co-located with a subscriber's satellite. When needed, it will travel the GEO arc to wherever the defective spacecraft is located, and take over all or some of its frequencies. Farrell claims to have customers for one-third of AssureSat initial capacity, but he's not naming names. Nor does he cite prices. What he does say is that his service will be cheaper than having a wholly-owned, backup-only satellite like Aswtra-1 H; but this also carries a Ka-band interactive payload for the use of SES.

IAC-CREATE-DATE: December 2, 1999

LOAD-DATE: December 03, 1999

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Reinsurance Magazine

June 4, 1999

SECTION: Pg.21

LENGTH: 2729 words

HEADLINE: TECHNICAL REPORT: AVIATION AND SPACE; A CONSTELLATION OF RISKS.

BODY:

Last month Reinsurance reported the news from Generali's space insurance conference in Florence. Here Alex Beatty takes a closer look at some issues affecting the market.

Life in the space market is tough these days. An unprecedented level of losses last year wiped out premiums twice over and left underwriters nursing bruised egos - and balance sheets.

Italian insurer Generali estimates that space insurers paid out $1.4bn in claims last year and a further $500m in claims remains outstanding.

Major losses included Galaxy 10, which was insured for $250m, and the loss of 12 Globalstar satellites, costing $162m.

Despite these heavy losses the market remains hugely overcapitalised and intensely competitive, leaving underwriters with little chance to increase premiums. Obviously, this dire situation is foremost in the minds of underwriters, but several other issues emerged from Generali's recent space insurance conference in Florence that (re)insurers in the sector would do well to address.

DEVELOPING INDUSTRY

Like every other sector of the insurance world, underwriters and brokers in the space sector are fond of repeating the mantra of client service.

As the space industry is relatively new and developing at a prodigious rate, insurers have to be particularly quick to react to the changing demands of clients.

Commercialisation of space activity is accelerating as businesses take over from governments as the main drivers of the space industry. Edward Frankle, general counsel for the US National Aeronautics and Space Administration (NASA), pointed out that in 1997 commercial space activity overtook government sponsored projects to account for more than half of worldwide space revenues of $77bn.

CONSTELLATIONS

One such change in clients' attitude has been the move from insurance protection for a single satellite to cover for a constellation of dozens of satellites. The creation of large networks of satellites designed to give global coverage, such as Iridium with its 66 satellites, have forced space insurers to take a different approach.

Operators are now more concerned with the effects of failures on their ability to provide a service to their clients. Peter Jackson, chief executive of AsiaSat, explained: "If the revenue earning ability of a satellite is damaged we want to get a pro rata claim."

Satellite constellations are obviously built to tolerate satellite failures - in the case of Iridium the satellites only have an average life expectancy of five years. Ted Ignacy, chief financial officer of Telesat Canada, pointed out: "The fact of the matter is that satellites fail. When the unthinkable happens, the mere existence of adequate insurance cover makes lenders and shareholders a lot easier to get along with."

However, he added: "The one thing that insurance does not do is keep our customers in service, and we must remember that if Telesat, as an operator, cannot keep its customers in service or provide its customers with reasonable assurance that there will be continuity of service, we will lose those customers. If we don't have customers, we don't have a business, we don't buy satellites or launches or need insurance."

SPARE SATELLITES

More than one speaker at the conference called for the space industry to provide spare capacity to keep satellite operators in business even if they suffer a severe loss. However, while this could help to secure the future of the space and satellite communications industry, it is impractical in business terms for operators to keep satellite capacity unused.

Telesat Canada's Mr Ignacy suggested a bold strategy: "The idea might be to strategically place, in geostationary orbit, a few small satellites of different frequency bands. When an operator suffers a failure, he could make use of the small 'sparesats' until he is able to replace the lost asset. Following replacement, the sparesat would be returned to its parking orbit." He suggested that these spare satellites could be paid for by a combination of insurers, manufacturers and operators.

Gunter Kring, executive vice-president of satellite manufacturer Daimler Chrysler Aerospace, said "the insurance industry is challenged by manufacturers to upgrade to business partner". However, space insurers already suffering from a recent disastrous run of losses may be less keen to become that involved in the business.

RELIABILITY

Space insurers are becoming increasingly concerned about the perceived decline in the reliability of both satellites and launch vehicles. Recent incidents such as last month's failure of Boeing's new Delta III launch vehicle, which placed a Loral satellite in an orbit that was thousands of miles too low, have heightened fears among insurers that commercial concerns are eating away at the testing and development of space vehicles, leading to an increase in failure rates.

In April, Lockheed Martin's Titan IV also stranded a communications satellite in the wrong orbit and, while this was an uninsured military satellite, the incident still raises worrying questions about the reliability of US launch vehicles.

IN-ORBIT LOSSES

Last year's unprecedented number of in-orbit losses is particularly worrying for underwriters. In the past, in-orbit losses have been comparatively rare, which is why only a small part of the premium covers this risk.

If in-orbit losses are becoming more frequent, then insurers will have to adjust premiums to cover the increased likelihood of failure. However, market conditions will make that task very difficult.

UNPROVEN SPACECRAFT

Giovanni Gobbo, space department manager at Generali, was sharply critical of manufacturers in his address, which was pessimistically titled 'The dark shadows on the insurance industry'. He said that fierce competition prevented insurers from charging additional premium for experimental or unproven launch vehicles. He added: "Fly what you test, test what you fly."

Ernest Robertson, vice-president at Space Systems Loral, admitted: "Trends show unacceptable spacecraft reliability performance." Many insurers believe that this will be a growing trend as commercialisation remodels an industry that previously relied on the support of state governments which were prepared to tolerate higher testing and development costs.

These concerns were addressed by Romain Bausch, director general of SES Astra. He claimed that his company was willing to accept the additional cost of performing extra testing on the ground.

He added that thorough investigation of a launch failure was essential if the same mistakes were not to be repeated. As an example, he cited SES Astra's investigation into the failure of a Russian military satellite, which revealed information that prevented the loss of one of their own satellites.

LICENSING RISK

With overcapacity rife in the space insurance sector, underwriters are searching for new risks to cover in the hope of attracting more premium.

One of the risks currently being investigated by insurers is the licensing risk associated with satellite networks.

While satellite networks may be technically able to operate throughout the globe, they will still need the permission of telecommunications regulators in each of their target markets. With no internationally accepted framework for licences, the operator must obtain licences in each jurisdiction individually.

If satellite operators are unable to obtain enough licences, the overall success of the business might be threatened.

Stephan Le Goueff, of Luxembourg-based law firm Le Goueff Advocates, which specialises in the space and telecommunications sector, said: "Don't take market access for granted." He pointed out that only 52 countries have agreed to guarantee market access for satellite services as laid out in the World Trade Organisation's 1997 Agreement on Basic Telecommunications Services, and 23 countries have delayed access until 2000 or later.

Mr Goueff suggested that space insurers had a role to play in providing cover for the risk of an operator losing its licence. "Such coverage would be similar to political risk insurance, save that its application would not necessarily be limited to politically unstable countries," he said.

SPACE DEBRIS

The dangers posed to satellites by the growing number of uncontrolled objects orbiting the Earth was a great talking point at Generali's space insurance conference in Venice two years ago (Reinsurance, June 1997, p18).

The issue was raised again at this year's conference by Walter Flury, head of the mission analysis section of the European Space Agency. He reported that there are currently more than 100,000 objects larger than 1cm in orbit. These objects are tracked by surveillance systems in the US and Russia.

Mr Flury suggested that it was impractical to 'clean up' debris, but that it was essential to attempt to manage the risk of collision.

He advised that satellite operators be warned of likely collisions in advance so that the satellite could manoeveur itself to avoid debris.

This would require much more accurate tracking from the ground and greater reserves of propellant aboard the satellite. It could also interrupt normal operations.

Mr Flury added that space users will have to take steps to prevent the problem of space debris worsening. He suggested that space users regulate themselves through subscribing to a code of conduct which would aim to stop the build-up of space debris. He also suggested that space insurers would have a role to play by linking an insured's premium to compliance with the debris standards.

SATELLITE PIRACY

Satellite piracy hit the headlines in March when computer hackers claimed to have gained access to one of the UK's military satellites. While confirmed cases of satellite hijacking are very rare, the possibility is causing concern among insurers.

Benito Pagnanelli, managing director of Generali Global, said: "If pirates, who can modify its use, seize a satellite, causing a potential risk and damage, what are the possible impacts on the owner/user and perhaps on the insurer? From a technical point of view the operation is not so difficult, and it doesn't even require significant resources."

He also highlighted the concern that pirates might be able to interrupt or manipulate satellite services that transmit real-time financial data.

FIGURE 1: IN-ORBIT INSURANCE LOSSES - 1998-99

SATELLITE	EVENT	DATE
IRIDIUM 48	Retired - due to attitude control/propulsion system failure	18/1/98
GALAXY 81	Power systems anomaly	2/98
IRIDIUM 32	Telemetry, tracking and command anomaly	4/3/98

PANAMSAT 5	Power systems anomaly	3/98
CAKRAWARTA 1	Power systems anomaly	16/3/98
SKYNET 4D	Transponder anomaly	16/3/98
KUPON 1	Telemetry, tracking and command anomaly	17/3/98
TELEDESIC T1	Telemetry, tracking and command anomaly	30/3/98
IRIDIUM 11	Retired - due to attitude control/propulsion system failure	Early 1998
IRIDIUM 20	Retired - due to attitude control/propulsion system failure	6/4/98
IRIDIUM 24	Retired - due to attitude control/propulsion system failure	30/4/98
ECHOSTAR 4	Power systems anomaly	19/5/98
GALAXY 4	Attitude control/propulsion system anomaly	19/5/98
IRIDIUM 69	Electric sub-system anomaly	26/5/98
UHF 8	Transponder anomaly	1998
IRIDIUM 71	Retired - due to telemetry, tracking and command failure	14/7/98
IRIDIUM 44	Retired - due to attitude control/propulsion system failure	17/7/98
IRIDIUM 14	Retired - due to telemetry, tracking and command failure	1/9/98
SIRIUS 2	Power systems anomaly	1/9/98
TDF-2	Transponder anomaly	25/9/98
AFRISTAR 1	Power systems anomaly	30/10/98
PANAMSAT 8	Payload instrument/beam/on-board data anomaly	5/11/98
PALAPA C1	Power systems anomaly	21/11/98
ASTRA 1A	Power systems anomaly	26/3/99

Source: Airclaims SpaceTrak database (Tel: +44 181 897 1066).

FIGURE 2: LAUNCH FAILURES - 1998-99

SATELLITE	CAUSE OF LOSS
OFEQ 4	Failed to enter Earth orbit (launch vehicle related)
COMETS	Entered Earth orbit but failed to achieve transfer orbit (launch vehicle related)
COSMOS 2352	Entered transfer orbit but failed to achieve intended final orbit (launch vehicle related)
COSMOS 2353	Entered transfer orbit but failed to achieve intended final orbit (launch vehicle related)
COSMOS 2354	Entered transfer orbit but failed to achieve intended final orbit (launch vehicle related)
COSMOS 2355	Entered transfer orbit but failed to achieve intended final orbit (launch vehicle related)
COSMOS 2356	Entered transfer orbit but failed to achieve intended final orbit (launch vehicle related)
COSMOS 2357	Entered transfer orbit but failed to achieve intended final orbit (launch vehicle related)

MERCURY 3 Failed to enter Earth orbit (launch vehicle related)

GALAXY 10 Failed to enter Earth orbit (launch vehicle related)

KWANGMYONGSONG 1 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M10 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M11 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M12 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M13 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M16 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M17 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M18 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M20 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M21 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M5 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M7 Failed to enter Earth orbit (launch vehicle related)

GLOBALSTAR M9 Failed to enter Earth orbit (launch vehicle related)

WIRE Achieved final orbit, but not operational (payload related)

DSP 19 (IUS) Entered transfer orbit but failed to achieve intended final orbit (payload related)

IKONOS 1 Failed to enter Earth orbit (launch vehicle related)

MILSTAR 2-F1 Entered Earth orbit but failed to achieve transfer orbit (launch vehicle related)

ORION 3 Entered Earth orbit but failed to achieve transfer orbit (launch vehicle related)

SATELLITE	DATE	LAUNCH VEHICLE
OFEQ 4	22/1/98	SHAVIT 1
COMETS	21/2/98	H2
COSMOS 2352	15/6/98	TSYKLON 3
COSMOS 2353	15/6/98	TSYKLON 3
COSMOS 2354	15/6/98	TSYKLON 3

COSMOS 2355 15/6/98 TSYKLON 3

COSMOS 2356 15/6/98 TSYKLON 3

COSMOS 2357 15/6/98 TSYKLON 3

MERCURY 3 12/8/98 TITAN-IVA CENTAUR

GALAXY 10 27/8/98 DELTA III 8930

KWANGMYONGSONG 1 31/8/98 TAIPO DONG 1

GLOBALSTAR M10 9/9/98 ZENIT 2

GLOBALSTAR M11 9/9/98 ZENIT 2

GLOBALSTAR M12 9/9/98 ZENIT 2

GLOBALSTAR M13 9/9/98 ZENIT 2

GLOBALSTAR M16 9/9/98 ZENIT 2

GLOBALSTAR M17 9/9/98 ZENIT 2

GLOBALSTAR M18 9/9/98 ZENIT 2

GLOBALSTAR M20 9/9/98 ZENIT 2

GLOBALSTAR M21 9/9/98 ZENIT 2

GLOBALSTAR M5 9/9/98 ZENIT 2

GLOBALSTAR M7 9/9/98 ZENIT 2

GLOBALSTAR M9 9/9/98 ZENIT 2

WIRE 5/3/99 PEGASUS XL/L.1011

DSP 19 (IUS) 9/4/99 TITAN IVB/IUS

IKONOS 1 27/4/99 ATHENA-2 (LMLV-2)

MILSTAR 2-F1 30/4/99 IVB/CENTAUR

ORION 3 5/5/99 DELTA III 8930
Source: Airclaims SpaceTrak database (Tel: +44 181 897 1066).

LOAD-DATE: June 7, 1999

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May 13, 1998, Wednesday

LENGTH: 251 words

HEADLINE: Hughes

DATELINE: EL SEGUNDO

BODY:

A Hughes Space and Communications Co. satellite recorded a first in space when it passed behind the moon for a gravity "boost" before heading back toward an Earth orbit, Hughes announced today.

The HGS-1 satellite passed behind the moon about noon yesterday, and will start "braking" Saturday as engineers try to guide it into an orbit around the equator, a Hughes spokesman said.

The unusual maneuver is part of a salvage mission for the satellite, which entered an **unusable, elliptical orbit** when the rocket taking it into space malfunctioned during its Christmas Day launch.

The mission is the first known lunar trip involving a communications satellite, and the first lunar mission financed by a non-governmental entity, according to Hughes.

The satellite came within 3,883 miles of the moon's surface yesterday at 12:55 p.m. It is now on a three-day return trip to an Earth orbit. It was designed to provide TV and other telecommunications services for Asia and neighboring regions.

The satellite's original owner filed an insurance claim, and the insurers declared the mission a total loss for its original purposes.

But Hughes scientists and engineers devised a salvage mission, using the moon's gravity to reposition the satellite into a usable circular path 22,300 miles above the equator, known as geosynchronous orbit.

If the salvage mission succeeds, Hughes has agreed to share the profits with the insurers.

NOTES:
Hughes PR is at (310) 364-6364.

LOAD-DATE: May 14, 1998

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Aviation Week and Space Technology

May 4, 1998

SECTION: HEADLINE NEWS; Vol. 148, No. 18; Pg. 38

LENGTH: 1378 words

HEADLINE: Hughes Using Moon For Orbit Change

BYLINE: BRUCE A. SMITH

DATELINE: LOS ANGELES

BODY:

Hughes Global Services (HGS) is gradually moving a previously-stranded commercial communications satellite into position near the Moon so that lunar gravity can be used to sling the spacecraft back to Earth and into at least a partially usable orbit.

The novel and fast-paced salvage effort involves the former AsiaSat-3 spacecraft, which was placed in the wrong orbit four months ago as the result of the failure of a Proton booster launched from the Baikonur Cosmodrome.

The high-power HS 601HP spacecraft originally was to have been placed in geosynchronous orbit at 105.5 deg. E. Long., but failure of the booster's fourth stage resulted in the satellite ending up in an orbit of 36,008 X 203-km., with an inclination of 51 deg.

The satellite was quickly declared a loss because it did not have enough propellant to reach the correct orbit. The launch vehicle and the spacecraft, built for Hong Kong-based Asia Satellite Telecommunications Co., were fully insured for $ 200 million, according to insurance industry executives.

Ronald V. Swanson, president of Hughes Global Services, said the company reached an agreement this month with the consortium of 27 AsiaSat-3 underwriters for HGS to invest in a recovery effort, evaluate the revenue potential of a new orbit and market the spacecraft. Any revenues gained from the new communications services would be **shared by HGS with the underwriters.**

SWANSON SAID THE COMPANY will invest less than $ 1 million in the experimental mission, although there will be significant added expenses in preparing the satellite for operations once it has achieved its new orbit and any customers have signed on for communications services.

Since the launch failure, Hughes has maintained the satellite, which is informally called HGS-1, in a safe condition. Hughes began seriously considering the rescue attempt in February. Ownership of the satellite was transferred to Hughes in April, and the mission to the moon began shortly thereafter. A new satellite name and orbital slot will be determined later.

"As insurers, we're happy we have shown it is possible to arrange a salvage of a seemingly lost satellite, and we appreciate the work that Hughes is doing to transfer it into a usable orbit," according to an insurance executive. He added, however, that he did not expect the salvage effort to have a significant impact on future satellite underwriting or salvage agreements because of the unusual orbit of AsiaSat 3 following its Baikonur launch.

Hughes began a series of 12 planned perigee burns on Apr. 10, and as of last week had completed 11 burns to move the Earth orbit apogee out to 321,000 km. All burns as of last week were nominal. The final burn, called the trans-lunar injection, is scheduled for May 7 and will result in a 5.75-day trip to the moon culminating in a swing-by on May 13, about 8,000 km. above the lunar surface.

Mark J. Skidmore, HGS moon mission project manager, said the critical final burn will place the satellite on a trajectory with a velocity of 24,000 mph., very close to escape velocity.

The final burn places the spacecraft in front of the Moon, slowing the satellite's velocity to about 3,000 mph., essentially twisting the spacecraft's trajectory for the return into a new Earth orbit inclination. The accuracy requirement for the lunar fly-by is about 1,000 km.

The short final burn will change the spacecraft's velocity by 24 meters per sec., compared to the previous burns which have ranged between 55-65 meters per sec.

That will be followed by a 3.25-day return to Earth at a fly-by distance of 42,000 km. Inclination in final orbit -- expected to be reached late this month -- could be about 18 deg, according to an industry official. Program officials said the spacecraft would probably drift about 3 deg. per day after achieving the new orbit.

The salvage mission was devised by orbital analysts at Hughes Space and Communications Co., of which HGS is a subsidiary. Analytical Graphics has been supporting Hughes in the mission with its Satellite Tool Kit/Navigator software, originally developed by Computer Sciences Corp.

JOHN P. CARRICO, SENIOR astrodynamics specialist at Analytical Graphics, said the generic software is intended for planning maneuvers, whether they be near-Earth trajectories or traveling to another planet. Uses of the commercially-available software on the HGS-1 recovery mission have included determining the fuel burns necessary to boost the satellite's apogee.

The spacecraft will remain dormant until a revenue base has been established. Hughes officials said the recovery mission has been largely made possible by HGS-1's all-liquid propulsion system and the ability to fly the satellite in a passive, spin-stable mode. The three-axis stabilized satellite currently is spinning at the rate of 10 rpm to maintain stability.

The single Liquid Apogee Motor (LAM) mounted at the base of the spacecraft is a Marquardt R4D-11300, with a thrust level of 110 lb. The combined bipropellant system originally held about 3,650 lb. of monomethyl hydrazine and nitrogen tetroxide in a four-tank system shared by the spacecraft's reaction control thrusters.

Program officials said about 43% of the spacecraft's propellant would be consumed to get to the Moon. They added that just about all of the propellant will be used to place the satellite in the best possible orbit, so there will not be north-south station keeping on the spacecraft when HGS-1 is in its operational orbit. As a result, the spacecraft will drift a little north and south each day, requiring a tracking antenna on the Earth's surface. The program plans to conduct east-west station keeping during operations because it requires significantly less propellant.

"The number of years (of operational use of the satellite) will be determined by the electronics, not the fuel," an official said.

Mark J. Schwene, HGS vice president, said possible communications markets for the satellite include providing capacity over ocean regions for the Navy, as well as providing sufficient communications services during times of crisis to meet military communications surge requirements.

In addition, Schwene said the spacecraft's moveable Ku-band spot beam could provide added flexibility to rapidly supply communications for military deployments, such as humanitarian relief missions. "This may also be the first case where the government can lease an entire satellite for less than they could buy the same capability," he said.

Schwene added that Hughes has the right to sell or lease the entire satellite to any interested party. "In our opinion, HGS-1 could be a breakthrough in the way the government uses commercial satellite communications," he said.

"I DON'T EXPECT THIS FIRST trans-lunar injection maneuver to be the last. Besides creating the additional possibility of being able to recover satellites from some types of booster malfunctions, the flexibility of the satellite product line's design gives us the additional option of using this maneuver as a planned part of the mission profile," Schwene said.

"While we haven't yet begun exploring what a standard lunar-injection to geosynchronous orbit fully means, it's clear that we may be able to reduce the cost of some missions, or even boost more payload in orbit for the same cost. Either of these could significantly benefit future satellite programs."

The proton launcher returned to flight successfully on Apr. 7, with the launch of seven Iridium satellites for Motorola.

Cause of the December failure was determined to be use of a defective wear-reducing coating applied to the internal seals of the fourth-stage engine high-pressure liquid oxygen pump. The seals resulted in an excessive volume of gaseous oxygen leaking into the liquid oxygen pump's impeller chamber.

AsiaSat ordered a 9,900-watt replacement satellite from Hughes last March, designated AsiaSat 3S, with launch on a Proton booster scheduled for the first quarter of 1999. The spacecraft has 28 active C-band and 16 Ku-band transponders.

Discussions regarding AsiaSat 4 are on hold until the organization has an opportunity to reassess the market in light of current economic conditions.
URL: http://www.aviationnow.com

LOAD-DATE: May 07, 1998

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Austin American-Statesman (Texas)

May 3, 1998

SECTION: News; Pg. A26

LENGTH: 801 words

HEADLINE: To the moon, Asiasat 3: Firm to jolt errant satellite

BYLINE: ANDREW POLLACK

BODY:

LOS ANGELES -- **In an ambitious salvage effort that is the first of its kind, a satellite manufacturer said last week that it is attempting to correct the orbit of an unusable satellite by flinging it around the moon and back toward Earth.**

Officials of the manufacturer, Hughes Electronics Corp., said the mission would be the first time a private company had sent a spacecraft to the moon.

The satellite, originally called Asiasat 3, was launched last Christmas Day from Kazakstan to provide television and telephone service in Asia. But the Russian- built Proton launching rocket malfunctioned, leaving the satellite in an orbit too low and too tilted relative to the equator to be useful. As is common in such cases, the satellite was declared a total loss, and its owner, Asia Satellite Telecommunications Co. Ltd. of Hong Kong, received a $200 million payment from a consortium of 27 insurance companies.

But engineers at Hughes, which built and launched the satellite, said Wednesday that the gravity of the moon could be used to put the satellite into an orbit around Earth where it could be used, though not for its original purpose.

"This is really the not-so-little spacecraft that could," Mark Skidmore, the mission project manager at Hughes, said at a news conference. When the idea was first proposed, he said, there were many naysayers, including him.

Executives at Hughes said that if the experiment worked, it could provide a new, low-cost way to restore errant satellites to service. In addition, using the moon's gravity as an energy source might allow for less expensive launches or for the launching of heavier satellites.

"The gravity of the moon is replacing fuel aboard the spacecraft," said Ronald Swanson, president of Hughes Global Services Inc., the subsidiary of the company conducting the mission. Hughes is owned by the General Motors Corp.

The technique, known as gravity assist, is used by the NASA to steer interplanetary spacecraft, like the Galileo mission to Jupiter, by looping them around planets. And the aborted Apollo 13 mission used the gravity of the Moon to help direct the spacecraft back toward Earth.

"There's no reason why it won't work," said Robert Mitchell, manager of the Galileo project at NASA's Jet Propulsion Laboratory.

Satellites that fail to get into proper orbit usually end up as $100 million pieces of space junk. In several cases, however, the space shuttle has been used to retrieve errant satellites, which have either been brought back to Earth for relaunching or sent on their way directly from the shuttle. But such efforts can cost hundreds of millions of dollars.

In other cases, the satellite's own motor, which is normally used to maneuver the craft into its final orbit and help maintain it there, has been used to boost an errant satellite into a higher orbit.

But even though Asiasat 3 had an unusually large 3,700 pounds of liquid fuel aboard, Hughes officials determined that would not be enough to move the satellite into its intended orbit, circling 22,300 miles above the equator in what appears to be a fixed position when viewed from Earth.

That is because the satellite was orbiting at a 51 degree inclination to the equator, and changing the inclination requires a lot of energy, Hughes officials said. It requires less energy to send the spacecraft to the moon, about 240,000 miles away, and use the moon's gravity to change the satellite's inclination.

Since April 10, Hughes has been activating the satellite's rocket, or motor, at precise times to boost the spacecraft's elliptical orbit into an increasingly elongated shape. On May 7, the 12th and final rocket firing is planned, which should send the spacecraft hurtling toward the moon, a journey that will take almost six days.

The satellite is supposed to do a figure-eight loop around the moon at a distance of about 5,000 miles and be slung back toward Earth, which will take another three days. But the craft would then be oriented in such a way that, with some more rocket firings, it could be reinserted into a nearly geostationary orbit by late May.

But the orbit would not be perfect, and the satellite's fuel would be essentially used up, so it would be impossible to keep the satellite in a stationary spot in the sky. Those problems will preclude its use for television broadcasting and will make the satellite unusable by the original customer.

Instead, Hughes will seek to sell or lease the satellite for other uses and will split the proceeds with the insurance companies. Executives said they thought the Navy might want to use the satellite for communications to and from ships. Correcting the orbit will cost less than $1 million, though more would be required to fully restore the satellite to use.

LOAD-DATE: May 5, 1998

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Business Insurance

October 24, 1994

SECTION: Pg. 32

LENGTH: 1093 words

HEADLINE: IN-ORBIT SATELLITE COVER OUT OF BUYERS' REACH

BYLINE: By STACY SHAPIRO

BODY:

LONDON-Satellite users need more insurance capacity for satellites in orbit than the market is providing, a London broker maintains.

Policyholders are looking for coverage that will last the lifetime of the spacecraft at "equitable" rating levels, said Phillip May, executive director of Willis Corroon InSpace.

However, what's available in the market "falls far short of what buyers need," he told delegates to the DYP Group Space Insurance Conference. The conference, held in London Sept. 27-28, was sponsored by London law firm Barlow Lyde & Gilbert and the Marchant Space Consortium.

The space insurance market currently is only offering short-term in-orbit coverage at rates that are too high with restrictive exclusions and sunset clauses, according to Mr. May. In addition, he said that satellite insurance underwriters offer only half the capacity for in-orbit insurance that they offer for satellite launch insurance.

This means that while satellite launch insurance capacity has more than doubled in the last 10 years, in-orbit insurance capacity has declined slightly to $220 million per risk in 1984 from $250 million in 1994, according to Mr. May.

Underwriters refuse to provide more capacity even though the in-orbit loss record is excellent, he added. Net premiums for the past 10 years total $445.9 million, while claims only total $220 million, of which $170 million was for the loss of one satellite, the Superbird A in December 1990 (BI, Jan. 14, 1991).

"The market should examine what they offer," Mr. May suggested. The underwriters should offer more capacity for in-orbit coverage and lower rates to reflect the excellent loss ratio over a 10-year period.

Rates currently are between 1.75% and 2.5% of a satellite's insured value, according to figures he provided.

At the same time, satellite users and manufacturers should provide full disclosure to underwriters about their orbiters and be committed to long-term insurance coverage, Mr. May said.

"I do believe there's a pent-up demand out there (for in-orbit coverage).*.*.the buyers are out there, ready and waiting," Mr. May said.

Underwriters rebutted Mr. May's arguments, saying that in-orbit insurance capacity is available-for a price.

"You say capacity is not available but that's not true," said Giovanni Gobbo, head of the space department of Assicurazioni Generali S.p.A. in Trieste, Italy.

"It is available, but not at the rate that's being offered," said Mr. Gobbo.

But Mr. May countered that the capacity is not there to cover the hardware of some of the new spacecraft in orbit, let alone the lost revenue if they fail.

If the terms were improved for the underwriter, "I'm sure you can unearth that capacity," said Lloyd's of London underwriter Michael Marchant, whose syndicate 282 leads the Marchant Space Consortium this year.

Meanwhile, Telesat Canada in April was able to buy in-orbit coverage for two satellites after correcting problems with the orbiters that had threatened their operation.

The telecommunications company bought $160 million of in-orbit coverage for each of its Anik E1 and Anik E2 satellites said Len Stass, vp of Telesat in Gloucester, Ontario.

The coverage was placed by Willis Corroon Melling in Canada and Nicholson Leslie Aviation in London, and is led by Lloyd's Ariel syndicate, said Frederick M. Bartlett, former vp-finance/administration and treasurer of Telesat who placed the coverage.

The in-orbit coverage was placed after Telesat in January lost control of the two then-uninsured satellites in orbit, possibly due to a combination of solar flares hitting electronic units that were located in the wrong place on the spacecraft.

To regain control, Telesat built two new ground stations in Canada and was able to restore the commercial service of the satellites by August, said Mr. Stass. The satellites probably only lost about 10% of their life expectancy due to the problems, he added.

Mr. Bartlett added that Telesat would have insured these satellites while they were in orbit, even if there had been no failure.

Although satellites' loss record in orbit has been excellent, there is still a chance that satellites will fail, added John Korda, director of the space programs division for Telesat and a consultant for the Marchant Space Consortium.

The skies are getting crowded and more satellites are being launched, so a collision between two satellites "will happen sooner or later," Mr. Korda warned.

The 11-year solar cycle also is in such a position now that an anticipated increase in solar flares could cause a "major threat" to the performance of satellites, he added.

Human interference also can cause losses, such as high altitude nuclear explosions, which can damage solar arrays on spacecraft.

Even the U.S. space shuttle's radar can produce very high electric fields that can burn out a satellite's circuit if it's in lower earth orbit, said Mr. Korda.

LOAD-DATE: October 27, 1994

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United Press International

February 26, 1991, Tuesday, BC cycle

SECTION: Financial

LENGTH: 289 words

HEADLINE: Corroon & Black starts program to rescue spacecraft

DATELINE: NEW YORK

BODY:

Corroon & Black Inspace Inc. said Tuesday it has started an insurnance risk management program for a mission to rescue a commercial spacecraft.

The mission, which will be performed by astronauts during the initial flights of the shuttle Endeavor, will reboost the Intelsat satellite into transfer orbit. The flight will take place in early 1992.

Intelsat is the international, non-profit cooperative of 119 member nations that owns and operates the global communications satellite system used worldwide by countries for their international and, sometimes, domestic communications.

"This reboost mission is extremely significant since it represents perhaps the most complicated manned mission to rescue a commercial spacecraft conducted to date," said Brian Stockwell, president of Corroon & Black Inspace. The firm is a subsidiary of Willis Corroon Corp., a broker of insurance for space projects.

The National Aeronautics and Space Administration shuttle will carry a replacement motor and meet the satellite in low earth orbit. The astronauts will attach the new motor and relaunch the satellite into transfer orbit, Stockwell said.

The original cost of the Intelsat project was more than $250 million. Hughes Aircraft will provide the replacement motor and the necessary handling equipment while NASA will handle the mission's performance.

The satellite when in the final orbit will provide telecommunications to the network of satellite customers.

"Each case of insurance for ventures of this kind requires the development of a risk management program which is specifically designed for that mission," Stockwell said.

Corroon & Black Inspace provides risk management programs for space projects.